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USPS LR-I-158

THE CALCULATION OF ELASTICITIES OF RUNNING TIME WITH RESPECT TO ACTUAL STOPS

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In support of the Direct Testimony of Postal Service Witness Donald M. Baron (USPS-T-12) in Docket No. R2000-1, this library reference provides the following documentation for the calculation of elasticities of running time with respect to stops on routes tested in the 1988 CATFAT Study.

1. ***Program Documentation*** – A description of the methods, procedures, input data sets, and variables that were used to produce the elasticities.

2. ***Program Listing*** – A listing of the programs CCS.CATFAT.CURB.R00.CNTL, CCS.CATFAT.FOOT.R00.CNTL, and CCS.CATFAT.LOOP.R00.CNTL

3. ***Output Listing*** – A listing of the output created by CCS.CATFAT.CURB.R00.CNTL, CCS.CATFAT.FOOT.R00.CNTL, and CCS.CATFAT.LOOP.R00.CNTL

4. ***Floppy Disk Containing CCS.CATFAT.CURB.R00.CNTL, CCS.CATFAT.FOOT.R00.CNTL, and CCS.CATFAT.LOOP.R00.CNTL***

1. Program Documentation

a. Methods and Procedures

Three separate programs, CCS.CATFAT.CURB.R00.CNTL, CCS.CATFAT.FOOT.R00.CNTL, and CCS.CATFAT.LOOP.R00.CNTL calculate elasticities of running time with respect to actual stops for curbline, foot, and park & loop routes, respectively. These three programs read in the CATFAT data sets CURB.SAS, FOOT.SAS, or LOOP.SAS, respectively, all of which were created by the SAS programs documented in Docket No. R97-1, USPS LR-H-142. These three data sets consist of one record for each of the 161 curbline routes, 78 foot routes, and 199 park & loop routes that make up the sample of routes surveyed in the Postal Service's 1988 Curbline and Foot Access (i.e. CATFAT) Study. The details of this CATFAT Study's survey design, field instructions, data collection, and database construction are presented in Docket No. R90-1, Direct Testimony of Jeffrey L. Colvin, USPS-T-7 at 28-29, and in R90-1, Exhibit USPS-7A, and USPS LRs F-187 through F-190.

CCS.CATFAT.CURB.R00.CNTL, CCS.CATFAT.FOOT.R00.CNTL, and CCS.CATFAT.LOOP.R00.CNTL next read in coefficient estimates for the variables INTERCEPT, ROUTE, STOPS, and $STOPS^2$. A unique vector of these coefficients is read into CCS.CATFAT.CURB.R00.CNTL for each of the 161 curbline routes. Similarly, a unique vector of coefficients is read into CCS.CATFAT.FOOT.R00.CNTL for each of 77 foot routes,[1] and a unique coefficient vector is read into CCS.CATFAT.LOOP.R00.CNTL for each of the 199 park & loop routes. All of these coefficient vectors were produced by the curbline, foot, and park & loop regressions derived in Docket No. R90-1, PRC LR-10. The coefficients are entered into the R00.CNTL programs through use of the CARDS statement.

CCS.CATFAT.CURB.R00.CNTL then merges data from CURB.SAS with the corresponding interaction model curb route regression coefficients. Similarly, CCS.CATFAT.FOOT.R00.CNTL and CCS.CATFAT.LOOP.R00.CNTL merge data from FOOT.SAS and LOOP.SAS, respectively, with the interaction model foot and park & loop regression coefficients. All three mergers are done by individual CATFAT route.

The three programs next calculate derivatives for each stop type (SDR, MDR, and BAM) for each such route. Each derivative is defined as the estimated STOPS coefficient for the route plus the product of its estimated $STOPS^2$ coefficient and an estimated value for actual stops. The latter is defined as the

[1] There are a total of 78 foot routes in the 1988 CATFAT data set. However, for one of these routes, only two tests were conducted to obtain data on running times and actual stops. Therefore, the data were insufficient to enable the interaction model to produce separate regression coefficients for that one route. Separate sets of coefficients were produced for the other 77 routes.

product of the route's possible stops recorded in the 1988 CATFAT data set and the average FY 1996 coverage ratio calculated for the given stop type that is being evaluated. Each derivative is then multiplied by the estimated actual stops and divided by the running time value that the regression predicts at those actual stops.

Thus, CCS.CATFAT.CURB.R00.CNTL calculates a total of 161 elasticities for each of the three stop types, with one elasticity calculated by stop type for each of the 161 curbline routes tested in the CATFAT study. Similarly, CCS.CATFAT.FOOT.R00.CNTL calculates 77 elasticities by stop type, and CCS.CATFAT.LOOP.R00.CNTL calculates 199 elasticities by stop type.

b. Input Data

CURB.SAS, FOOT.SAS, and LOOP.SAS

Each of these data sets contains CATFAT data for a particular route group.

CURB.SAS

Number of observations: 161
Number of variables: 30

FOOT.SAS

Number of observations: 78
Number of variables: 30

LOOP.SAS

Number of observations: 199
Number of variables: 30

The following variables in each data set are used to compute the elasticities:

CSTOPS - the number of possible stops on the route.

TESTNUM - a code identifying the CATFAT route.

RTY - a code identifying the route type.

2. Program Listing

The following documents list the SAS program statements for CCS.CATFAT.CURB.R00.CNTL, CCS.CATFAT.FOOT.R00.CNTL, and CCS.CATFAT.LOOP.R00.CNTL.

CCS.CATFAT.CURB.R00.CNTL